

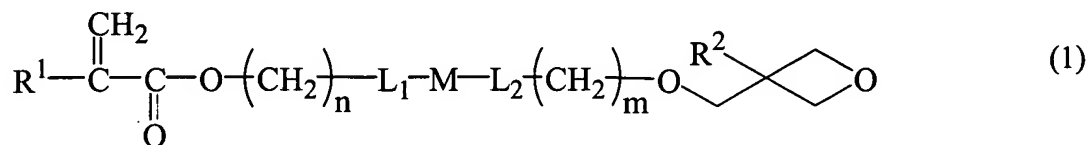
REMARKS

Claims 1-12 are currently pending in the instant application.

In the Office Action, the Examiner rejects claims 1-4 under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,136,225 of Meyer, *et al.* ("Meyer"), in view of *Hawley's Condensed Chemical Dictionary*, R. Lewis, Sr., Editor, 14th Ed., Wiley & Sons, Inc., New York, 2001 ("Hawley's"). Specifically, the Examiner contends that Meyer discloses a polymerizable liquid crystalline compound which is similar to the compound claimed by Applicants. However, the Examiner acknowledges that Meyer fails to disclose the inclusion of a terminal oxetane group in the compound. Nonetheless, the Examiner argues that Hawley's discloses that an oxetane group is a kind of epoxy group. On this basis, the Examiner argues that an oxetane group is a species of "the epoxy group" purportedly disclosed by Meyer. The Examiner argues that it would have been obvious to one of ordinary skill in the art to have incorporated an oxetane group in the compounds disclosed in Meyer because one of ordinary skill in the art "would have expected all species work successfully for the genus." (*See*, the Office Action, page 4).

Applicants strenuously, but respectfully, traverse this rejection and the arguments and contentions set forth in support thereof for the following reasons.

To begin with, one embodiment of Applicants' claimed invention is directed to methacrylic compounds also having an oxetanyl group which are represented by the general formula (I):



wherein each of the variables is as defined as set forth in claim 1. On the termini of the compound are a (meth)acrylic moiety and an oxetanyl moiety.

The Examiner has acknowledged that Meyer fails to disclose the presence of an oxetanyl moiety. However, the Examiner argues that based on the disclosure of an *epoxide* group as a potential substituent in the compounds of Meyer, that it would have been obvious to have included an oxetane group. Applicants respectfully disagree.

The only mention of any cyclic ether group in Meyer is limited to an epoxide. (See, e.g., Meyer, col. 2, lns 45 & 56). Epoxide refers specifically to a three-membered cyclic ether, also referred to, more appropriately, as oxirane. Oxetane, on the other hand, is a four-membered cyclic ether. This difference is not insignificant. Nowhere in Meyer, is the cyclic ether substituent generically referred to as “an epoxy group.” The only disclosure of a cyclic ether for use as a terminal polymerizable group in the compounds of Meyer is with respect to epoxide, *i.e.*, a three-membered cyclic ether.

The reactivity of an epoxide group and the reactivity of an oxetane group are significantly different. The strains placed on the bonds between the carbons and oxygen in a three-membered cyclic ether are different than the strains on the bonds in a four-membered oxetane group. Accordingly, the reactivity of the two different structures is also different and would not be expected to be the same. In fact, reactions which may be conducted with a three-membered epoxide group may not necessarily be easy to carry out with a four-membered oxetane group, and vice versa. For example, the first reaction in the synthetic preparation route disclosed in the instant application in paragraph [0050] (as published) would be unsuccessful if carried out with a three-membered cyclic ether (*i.e.*, epoxide) because the polymerization of the three-membered epoxide group would likely be the dominant reaction.

Thus, Applicants respectfully submit that the reference to oxetane as a type of epoxy group in Hawley's does not suggest the use of oxetane as a substituent in a reference directed to the potential inclusion of an epoxide group in a compound. In other words, while an epoxide, as disclosed in Meyer, and an oxetane may both be considered members of the “epoxy” family, the two are not interchangeable. *Moreover, Meyer simply fails to disclose any generic reference to all types of epoxies.* Meyer specifically references epoxide and depicts a three-membered cyclic ether group.

Given the difference in reactivity between an epoxide group and an oxetane group, it cannot reasonably be asserted that one of ordinary skill in the art would be motivated to substitute oxetane in the compounds of the Meyer reference wherein the specific three-membered epoxide group is disclosed as one potential substituent among many reactive groups.

Moreover, while Meyer does note that the reactive groups Z^1 and Z^2 may be independently selected from among the many reactive groups listed as being suitable, Meyer does specifically state that Z^1 and Z^2 are preferably identical. Thus, it is even more difficult to conclude that one of ordinary skill in the art would find motivation in the teachings of Meyer to not only deviate from the preferred teachings of the reference in order to arrive at a compound as

claimed wherein the terminal polymerizable groups are different, but to also depart from the teachings of the reference and select a terminal reactive group which is simply not disclosed in the reference.

Accordingly, Applicants respectfully submit that the combination of Meyer and Hawley's fails to satisfy the requirements necessary to establish a *prima facie* case of obviousness. Reconsideration and withdrawal of the rejection are respectfully requested.

In the Office Action, the Examiner rejects claims 5 and 6 under 35 U.S.C. §103(a), as being unpatentable over the combination of Meyer and Hawley's, further in view of Japanese Patent Publication No. 08-020641 and Japanese Patent Publication No. 06-308462, both of Kawakami ("JP '641 and JP '462", respectively, and "the Japanese references" collectively). The Examiner argues that it would have been obvious to one of ordinary skill in the art "to obtain polymeric liquid-crystalline compounds as taught by Meyer with molecular weight from 2,000 to 1,000,000 and the amount of 10 percent by mass of side-chain type liquid crystalline polymer to a liquid crystal material because Kawa[kami] teaches these specific embodiments of Meyer's polymeric liquid-crystalline compositions that fall into the generic teaching of Meyer." (See, the Office Action, page 5). In support of this erroneous argument, the Examiner further incorrectly contends that Kawakami discloses that "for high-molecular liquid crystal with the main chain consisting of polyoxetane, which is analog for the instant claim 2, the number-average molecular weight is preferably 1,000 - 1,000,000 . . ." (See, *id.*).

Applicants strenuously, but respectfully, traverse the Examiner's rejections and the arguments and contentions in support thereof for the following reasons. The Examiner's interpretation of JP '641 and JP '462 is simply wrong. The high molecular weight liquid crystal compounds disclosed in both of the Japanese references contain a polyoxetane backbone. The side chain-type liquid crystalline polymeric substance of claim 2 and those dependent on claim 2 in the instant application are based on the homopolymerization of the (meth)acrylic portion of the compound of claim 1. Accordingly, the side chain-type liquid crystalline polymeric substance of the instant claims comprises a (meth)acrylic backbone. In contrast, the Japanese references are directed to side chain-type polymers based upon a polyoxetane backbone. The fact that the compound of claim 1 includes an oxetane group does not render the side chain polymers of the Japanese references "analogs" of the claimed substances. In this regard, the Examiner's interpretation of the Japanese references is incorrect. Accordingly, neither JP '641 or JP '462 remedies the deficiencies of the Meyer and Hawley's references.

Thus, Applicants respectfully submit that the combination of Meyer, Hawley's and the Japanese references fails to satisfy the criteria required to establish a *prima facie* case of obviousness. Reconsideration and withdrawal of this rejection are respectfully requested.

In the Office Action, the Examiner rejects claim 7 under 35 U.S.C. §103(a), as being unpatentable over the combination of Meyer and Hawley's, further in view of U.S. Patent Application Publication No. 2003-0104144 of Hammond-Smith, *et al.* Additionally, in the Office Action, the Examiner rejects claims 8-12 under 35 U.S.C. §103(a), as being unpatentable over the combination of Meyer and Hawley's, further in view of Hammond-Smith, U.S. Patent No. 6,712,992 of Prechtl, *et al.* and U.S. Patent No. 6,171,518 of Hikmet, *et al.*

While not agreeing in any way with the Examiner's arguments and contentions directed to the methods and films of the present invention in support of the rejections based upon Hammond-Smith, Prechtl and Hikmet, Applicants note that none of the three additional references remedy the deficiencies discussed above with respect to Meyer and Hawley's. None of the three additional secondary references teaches or suggests the incorporation of an oxetane terminal group in the polymerizable compounds of claim 1. Each of claims 7 through 12 of the instant application are dependent upon claim 1, either directly or indirectly. As none of the secondary references remedies the deficiencies of the two primary references (Meyer and Hawley's), Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness based upon the combinations set forth in the Office Action.

Accordingly, reconsideration and withdrawal of the rejections based upon Hammond-Smith, Prechtl and/or Hikmet, are respectfully requested.

In view of the Remarks set forth above, Applicants submit that all pending claims patentably distinguish over the prior art of record and known to Applicants. Reconsideration, withdrawal of all rejections and a Notice of Allowance are respectfully requested.

Respectfully submitted,

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